The invention claimed is:

1. A method of encoding information symbols for multiple antennae transmission comprising the steps of:

generating a code matrix B_0;

generating a transformation matrix L where; and

combining the code matrix B_0 with the transformation matrix L to obtain a result B for controlling the amount of beamforming relative to the amount of orthogonal coding in signals transmitted from the multiple antennae.

2. The method of claim 1 wherein the transformation matrix L is a matrix such that, when the conjugate transpose of L is multiplied by L generates a desired correlation matrix Φ.

3. The method of claim 2 wherein the code matrix B_0 is orthogonal.

4. A method of encoding information symbols for multiple antennae transmission comprising the steps of:

generating a code matrix B_0;

generating a transformation matrix L where L satisfies the relationship where $\Phi = L^H L$ is a desired correlation matrix Φ; and

combining the code matrix B_0 with the transformation matrix L to obtain a result B for controlling the amount of beamforming relative to the amount of orthogonal coding in signals transmitted from the multiple antennae.

5. The method of claim 4 wherein the desired correlation matrix is comprised of at least one correlation parameter λ.

6. The method of claim 5 wherein the transformation matrix L is the matrix square root of the desired correlation matrix Φ.

7. The method of claim 4 wherein blocks of symbols of a serial data stream of user data are encoded with an orthogonal code to form code matrix B_0.

8. A method of generation signals for transmitting from at least two antennae of a wireless communications system comprising the steps of:

feeding a stream of incoming information symbols to an encoder;

feeding a signal representative of a beamforming weight parameter to the encoder to modify the stream of information symbols;

feeding a code correlation parameter (λ) to the encoder to control the proportion of orthogonal coding relative to beamforming of the stream of information symbols that are to be transmitted; and

feeding the stream of information symbols modified by the code correlation parameter to at least two antennae for transmission.

9. The method of claim 8 wherein the code correlation parameter determines the correlation of the encoded signals to the different antennae.

10. The method of claim 9 wherein the signal representative of the beamforming weight parameter represents a complex number having a magnitude and a phase.

11. The method of claim 9 wherein the signal representative of the beamforming weight parameter is of a real number of the phase of the beamforming weight parameter.

12. The method of claim 11 wherein the code correlation parameter is of a real number can vary between a first value and a second value.

13. The method of claim 12 wherein one of the values represents orthogonal coding with no beamforming and the other value represents beamforming with no orthogonal coding, and intermediate values represent a combination of orthogonal coding and beamforming.

14. The method of claim 9 wherein, in a duplex communication system having a forward and reverse link, the code correlation parameter is determined from signals received on the reverse link.

15. The method of claim 14 further comprising the step of determining a channel correlation coefficient (ρ) from the signals received on the reverse link.

16. The method of claim 15 wherein the channel correlation coefficient (ρ) is a complex number from which the magnitude component and not the phase component is used to determine the code correlation parameter λ.

17. The method of claim 14 wherein the channel correlation coefficient is an estimate of auto-correlation coefficient of channel gain from an antenna for a fixed time delay.

18. The method of claim 17 wherein the delay is determined by the difference between the time at which feedback information is transmitted on the reverse link to the time at which the beamforming weight parameter computed using that information is applied by the forward link transmitter.

19. The method of claim 18 wherein the delay is equal to the time difference multiplied by the ratio of carrier frequencies on the reverse and forward links.

20. The method of claim 8 wherein the symbol signal transmitted by each antenna at each symbol time is the sum of one or more signals, each of which is proportional to the product of one of the incoming symbols and their complex conjugates and their negations and their negations of their complex conjugates, with a number that is determined by lambda.

21. A method of forming a signal comprising the steps of:

obtaining at least two component signals;

multiplying a first component signal by a first complex number to obtain a first signal;

multiplying a second component signal by a second complex number to obtain a second signal;

wherein the phases of the first and second complex numbers are unequal; and

subtracting the second signal from the first signal to obtain a first composite signal for transmission by a first antenna element during a first transmit period.

22. A method of forming signals for transmission from an antenna element during two transmit periods comprising the steps of:

obtaining at least two component signals for each transmit period;

multiplying a first component signal by a first complex number to obtain a first signal;

multiplying a second component signal by a second complex number to obtain a second signal;

wherein the phases of the first and second complex numbers are unequal;

subtracting the second signal from the first signal to obtain a first composite signal for transmission by the first antenna element during a first transmit period;

multiplying a third component signal by a second complex number to obtain a third signal;

multiplying a fourth component signal by a first complex number to obtain a fourth signal; and

adding the third signal to the fourth signal to obtain a second composite signal for transmission by the antenna element during a second transmit period.

23. A method of forming signals for transmission from two antenna elements during two transmit periods comprising the steps of:

obtaining at least two component signals for each antenna for each time interval;

multiplying a first component signal by a first complex number to obtain a first signal;

multiplying a second component signal by a second complex number to obtain a second signal;

wherein the phases of the first and second complex numbers are unequal;

subtracting the second signal from the first signal to obtain a first composite signal for transmission by a first antenna element during a first transmit period;

multiplying a third component signal by a second complex number to obtain a third signal;

multiplying a fourth component signal by the first complex number to obtain a fourth signal;

adding the third signal to the fourth signal to obtain a second composite signal for transmission by the first antenna element during a second transmit period;

multiplying the first component signal by a third complex number to obtain a fifth signal;

multiplying the second component signal by a fourth complex number to obtain a fourth signal;

wherein the phases of the third and fourth complex numbers are unequal;

adding the third signal to the fourth signal to obtain a third composite signal for transmission by the second antenna element during the first transmit period;

multiplying the third component signal by the fourth complex number to obtain a fifth signal;

multiplying the fourth component signal by the their complex numbers to obtain a sixth signal;

wherein the fifth and sixth complex numbers are unequal; and

subtracting the fifth signal from the sixth signal to obtain a fourth composite signal for transmission by the second antenna element during the second transmit period.

24. The method of claim 23 wherein the component signals are determined by at least one incoming information symbol and at least one of the component signals is related to a code correlation parameter.

25. The method of claim 24 wherein each component signal is related to at least one of two information symbols, or their negations, or their complex conjugates or the negations of their complex conjugates.

26. A method of forming a signal comprising the steps of:

obtaining at least two component signals;

applying a first phase to a first component signal to obtain a first signal;

applying a second phase to a second component signal to obtain a second signal;

wherein the first and second phases are unequal; and

combining the second signal and the first signal to obtain a first composite signal for transmission by a first antenna element during a first transmit period.

27. A method of forming signals for transmission from an antenna element during two transmit periods comprising the steps of:

obtaining at least two component signals for each transmit period;

applying a first phase to a first component signal to obtain a first signal;

applying a second phase to a second component signal to obtain a second signal;

wherein the first and second phases are unequal;

combining the second signal and the first signal to obtain a first composite signal for transmission by the first antenna element during a first transmit period;

applying a second phase to a third component signal to obtain a third signal;

applying a first phase to a fourth component signal to obtain a fourth signal; and

combining the third signal and the fourth signal to obtain a second composite signal for transmission by the antenna element during a second transmit period.

28. A method of forming signals for transmission from two antenna elements during two time intervals comprising the steps of:

obtaining at least two component signals for each antenna for each time interval;

applying a first phase to a first component signal to obtain a first signal;

applying a second phase to a second component signal to obtain a second signal;

wherein the first and second phases are unequal;

combining the second signal and the first signal to obtain a first composite signal for transmission by a first antenna element during a first time interval;

applying the second phase to a third component signal to obtain a third signal;

applying the first phase to a fourth component signal to obtain a fourth signal;

combining the third signal and the fourth signal to obtain a second composite signal for transmission by the first antenna element during a second time interval;

applying a third phase to the first component signal to obtain a fifth signal;

applying a fourth phase to the second component signal to obtain a fourth signal;

wherein third and fourth phases are unequal;

combining the third and fourth signals to obtain a third composite signal for transmission by the second antenna element during the first transmit period;

applying the fourth phase to the third component signal to obtain a fifth signal;

applying the third phase to the fourth component signal to obtain a sixth signal; and

combining the fifth signal and the sixth signal to obtain a fourth composite signal for transmission by the second antenna element during the second time interval.